Wesley H. Huang

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Education

Ph.D. in Robotics, Carnegie Mellon University August 1997
Coursework included graduate level classes in robotic manipulation, mobile robot design, numerical methods, control, perception, and computer vision. My thesis, entitled *Impulsive Manipulation*, studied the mechanics, planning, and control for using impulsive forces for robotic positioning. Advised by Matthew Mason and Eric Krotkov.

B.S. in Electrical Engineering, Massachusetts Institute of Technology June 1991
Coursework included digital electronics, computer control, circuits and electronics, artificial intelligence, mechanical design, probability, chaos, computer science, and robotic manipulation. Thesis: *A Simple Robot Pool Player*. Thesis advisor: Christopher Atkeson.

Work Experience

Institute for Complex Engineered Systems, Carnegie Mellon University September 1997 - present
Postdoctoral Fellow, working on distributed cooperative mobile robotics and novel locomotion mechanisms.

Interval Research Corporation, Palo Alto, CA Fall 1996
Did hardware debugging on a mobile robot with custom digital video cameras and adapted stereo vision code for tracking in a project to study social behavior of mobile robots, in particular, human-robot interaction.

NSF Summer Institute in Japan Summer 1993
Spent two months in Japan taking Japanese language classes, visiting research laboratories, and working at the Electrotechnic Laboratory (ETL) in Tsukuba.

MIT Artificial Intelligence Laboratory Summer 1990
Programmed a real time image processing system to track balls for juggling robots. Supervised by Professor Christopher Atkeson.

MIT Parsons Laboratory Summer 1990
Refined infrared scatterometry hardware and automated a data acquisition system for a laboratory wave tank. Supervised by Professor W. Kendall Melville.

MIT Media Laboratory January 1988 - June 1989
Implemented a real time passive range camera. Developed C libraries and a LISP environment for a real-time image processing system. Supervised by Professor Alexander Pentland.

Supervisory Experience

Manipulation Lab, Carnegie Mellon University Fall 1995, Spring & Summer 1996, Spring 1997
Supervised three undergraduates, both in conjunction with my thesis research and in conjunction with other lab projects.

Teaching Experience

Pennsylvania Governor's School for the Sciences Summer 1995 & 1996
Taught Computer Science to 90 high school seniors. (The Pennsylvania Governor's School for the Sciences is a college level academic summer program for talented high school seniors.) Also managed a team of teaching assistants (three in 1995 and four in 1996).

Andrew's Leap, Carnegie Mellon University Summer 1994
Coinstructor for the robotics portion of this 6 week summer program for talented Pittsburgh area teenagers. Taught C programming, instructed students in use of robots, and oversaw student group projects.

Carnegie Mellon University Fall 1993
Teaching Assistant for *Analysis I*, a freshman level theoretical calculus class. Taught a recitation section twice per week and helped grade homework and exams.

Johns Hopkins University Summer 1992
Instructor for *Data Structures and Algorithms* and *Digital Logic* courses in the CTY program (an intensive academic summer program for talented 12 - 16 year olds).

Johns Hopkins University Summer 1991
Teaching Assistant for *Computer Science I* and *Digital Logic* courses in the CTY program.

MIT Experimental Study Group Spring and Fall 1990, Spring 1991
Taught freshman physics (mechanics in the fall, electricity and magnetism in the spring) and calculus to small groups of students in this alternative freshman year program.

Awards

NASA Graduate Student Research Program Fellow September 1993 - August 1996

IBM Thomas J. Watson Memorial Scholarship 1987 - 1991

Publications

W. Huang and M. Mason, *Experiments in Impulsive Manipulation*, submitted to the 1998 IEEE International Conference on Robotics and Automation.

W. Huang and M. Mason, *Mechanics, Planning, and Control for Tapping*, accepted to the 1998 Workshop on the Algorithmic Foundations of Robotics

S. Akella, W. Huang, K. Lynch, and M. Mason, *Parts Feeding on a Conveyor with a One Joint Robot*, accepted for publication in Algorithmica.

W. Huang, *Impulsive Manipulation*, PhD Thesis, Robotics Institute, Carnegie Mellon, August 1997. Available as Robotics Institute Technical Report CMU-RI-TR-97-29.

W. Huang and M. Mason, *Mechanics for Vibratory Manipulation*, Proceedings of the 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM.

S. Akella, W. Huang, K. Lynch, and M. Mason, *Sensorless Parts Orienting with a One Joint Manipulator*, Proceedings of the 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM.

W. Huang and E. Krotkov, *Optimal Stereo Mast Configuration for Mobile Robots*, Proceedings of the 1997 IEEE International Conference on Robotics and Automation, Albuquerque, NM.

W. Huang and M. Mason, *Limiting Cases of Impulsive Manipulation*, Robotics Institute Technical Report CMU-RI-TR-96-24, Carnegie Mellon University, September 1996.

S. Akella, W. Huang, K. Lynch, and M. Mason, *Sensorless Parts Feeding with a One Joint Robot*, Workshop on the Algorithmic Foundations of Robotics, 1996.

S. Akella, W. Huang, K. Lynch, and M. Mason, *Planar Manipulation on a Conveyor with a One Joint Robot*, International Symposium on Robotics Research, 1995, Munich, Germany.

W. Huang, E. Krotkov, and M. Mason, *Impulsive Manipulation*, Proceedings of the 1995 IEEE Conference on Robotics and Automation, Nagoya, Japan.

A. Pentland, T. Darrell, M. Turk, and W. Huang, *A Simple, Real-Time Range Camera,* Proceedings of the 1989 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, San Diego, CA.

Skills

I have had extensive experience with UNIX workstations and some programming experience on Macs and on PCs running Windows. I program in C/C++, LISP, Mathematica, MATLAB, and Postscript, and have had experiences with many other languages. I often design documents and do strange things using LaTeX, FrameMaker, and Illustrator.

I have designed and built both electrical (mostly digital) and mechanical (mostly aluminum) hardware. I am adept with a soldering iron, an oscilloscope, and a logic analyzer, as well as a milling machine and a lathe.

Department & University Service

CMU Robotics Student Organization RoboBanker January 1995 - January 1996

CMU Vice President Student Advisory Committee member Fall 1994 - Spring 1995

CMU Graduate Student Organization representative Spring & Fall 1993

Community Service

Children's Hospital of Pittsburgh Fall 1997 - present
Work with Child Life specialists in unit for teenagers.

Pittsburgh New Works Festival Fall 1994
Led effort to build a "parking chair robot" for a benefit/fund-raising auction for the Pittsburgh New Works Festival, a nonprofit theater organization.

East End Cooperative Ministry, Pittsburgh, PA Fall 1991 & Spring 1992
Tutored an elementary school student in history and math and a high school student in algebra.

Personal Information

Have practiced martial arts for over 15 years. Currently studying Tai Chi; have previously studied Aikido, Karate, and Judo. Hold a black belt (sho-dan) in the Washin-ryu style of Karate and a brown belt (san-kyu) in Aikido.

Have been learning to play Go; currently about 7 kyu. Other interests include volleyball, music, juggling, cooking, and photography.

Citizenship: USA